WILD AGE

# LAND ROAMERS

WITHDRAWN

22

WILD AGE

# LAND ROAMERS

## STEVE PARKER

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The words in **bold** are explained in the Glossary on page 31.

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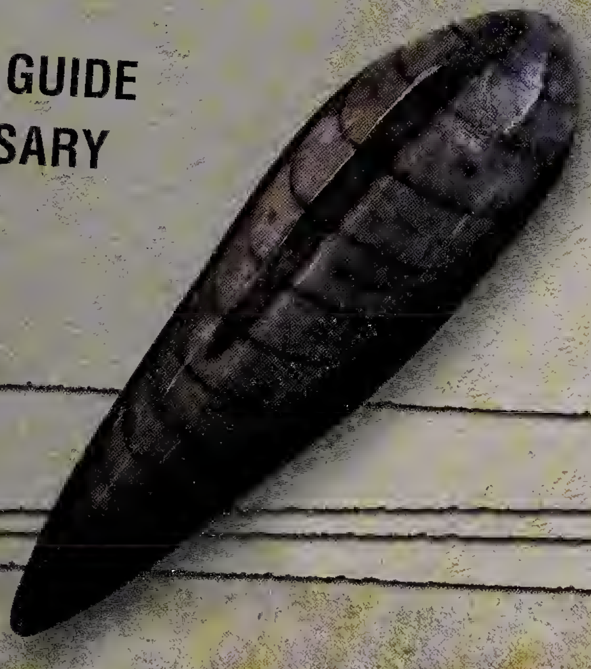


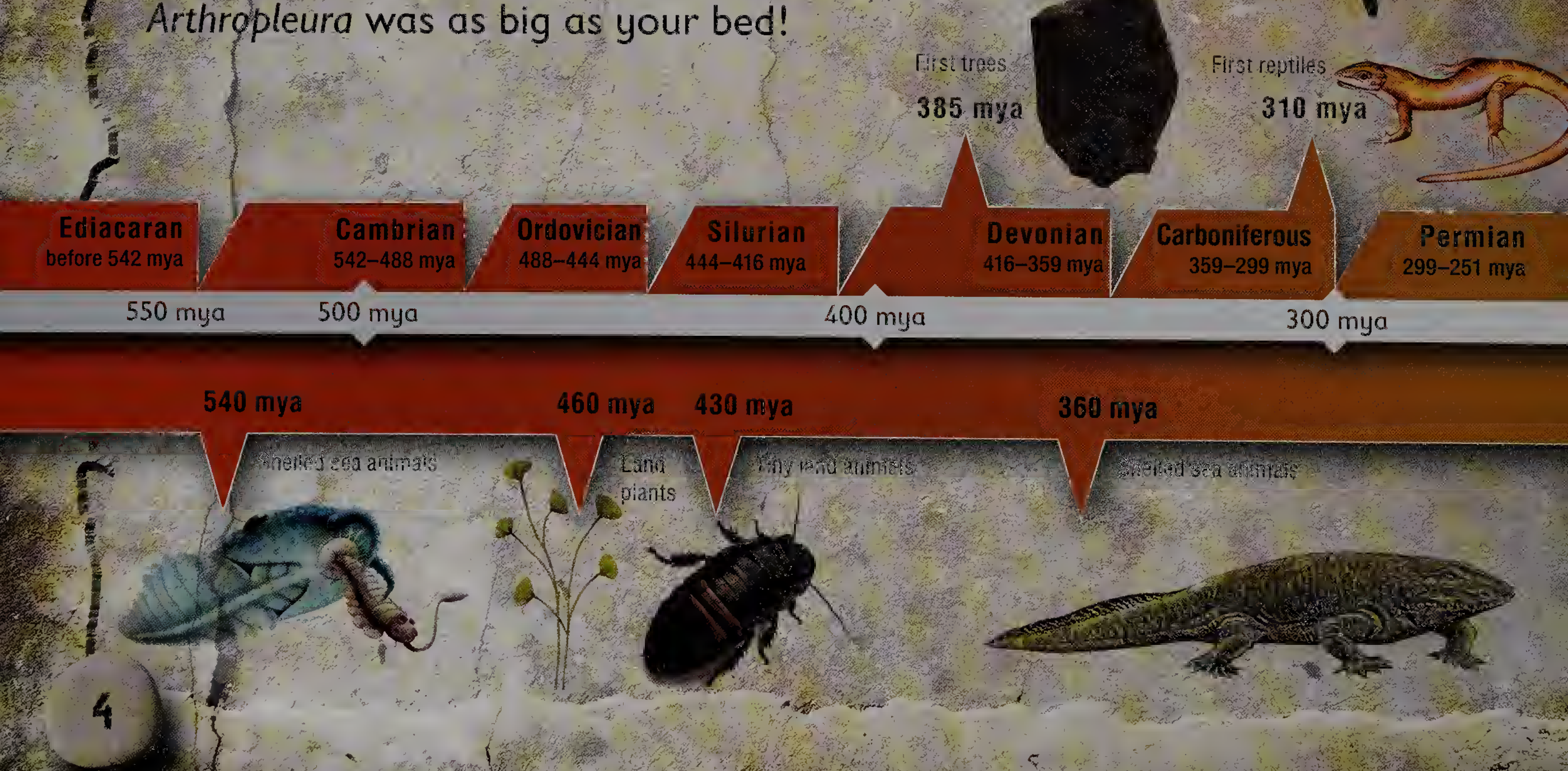
# FIRST ON TO LAND

**Long long ago, the first strange jelly-like creatures swam in the sea. Then came shelled animals and early fish. But the land was bare, with no life at all.**

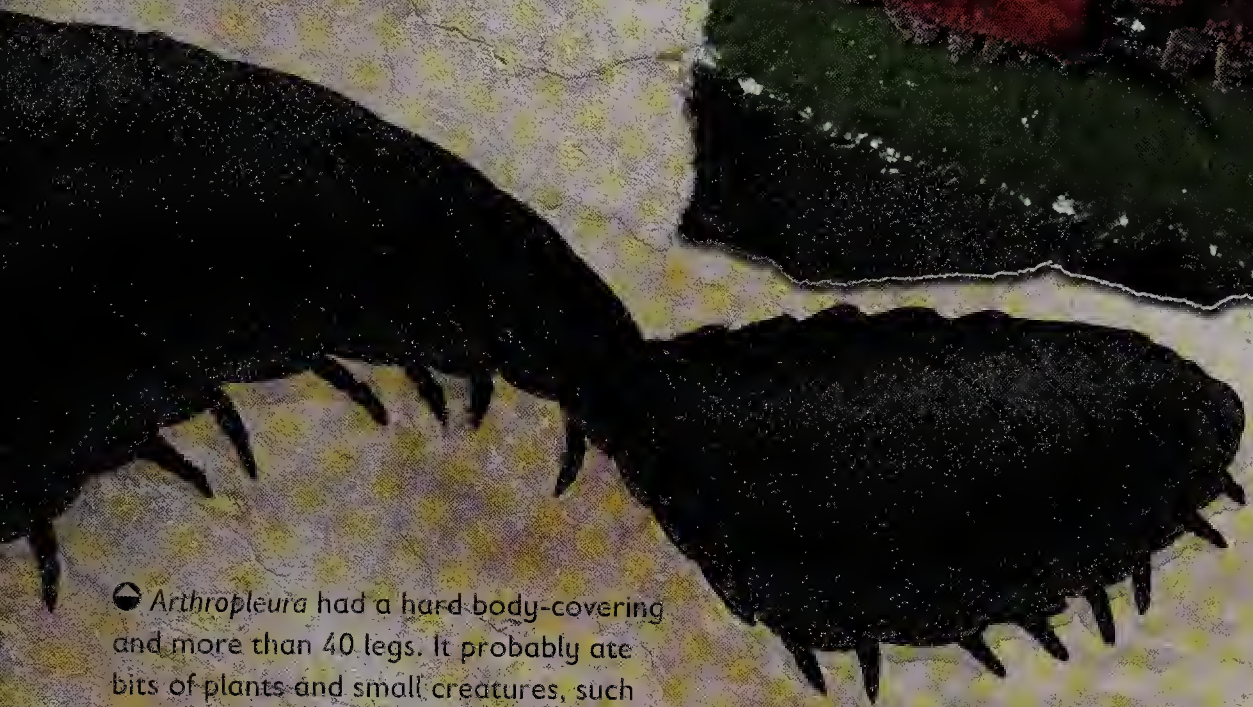
From about 460 million years ago, plants began to grow from the water's edge up onto the land. They spread and thrived. When the plants died, they rotted into the sand and mud, making the soil rich for bigger plants to grow.

Next, the first animals crawled from the water onto the land, to eat the plants. They were tiny **bugs** such as **insects** and **mites**, smaller than this 'o'.

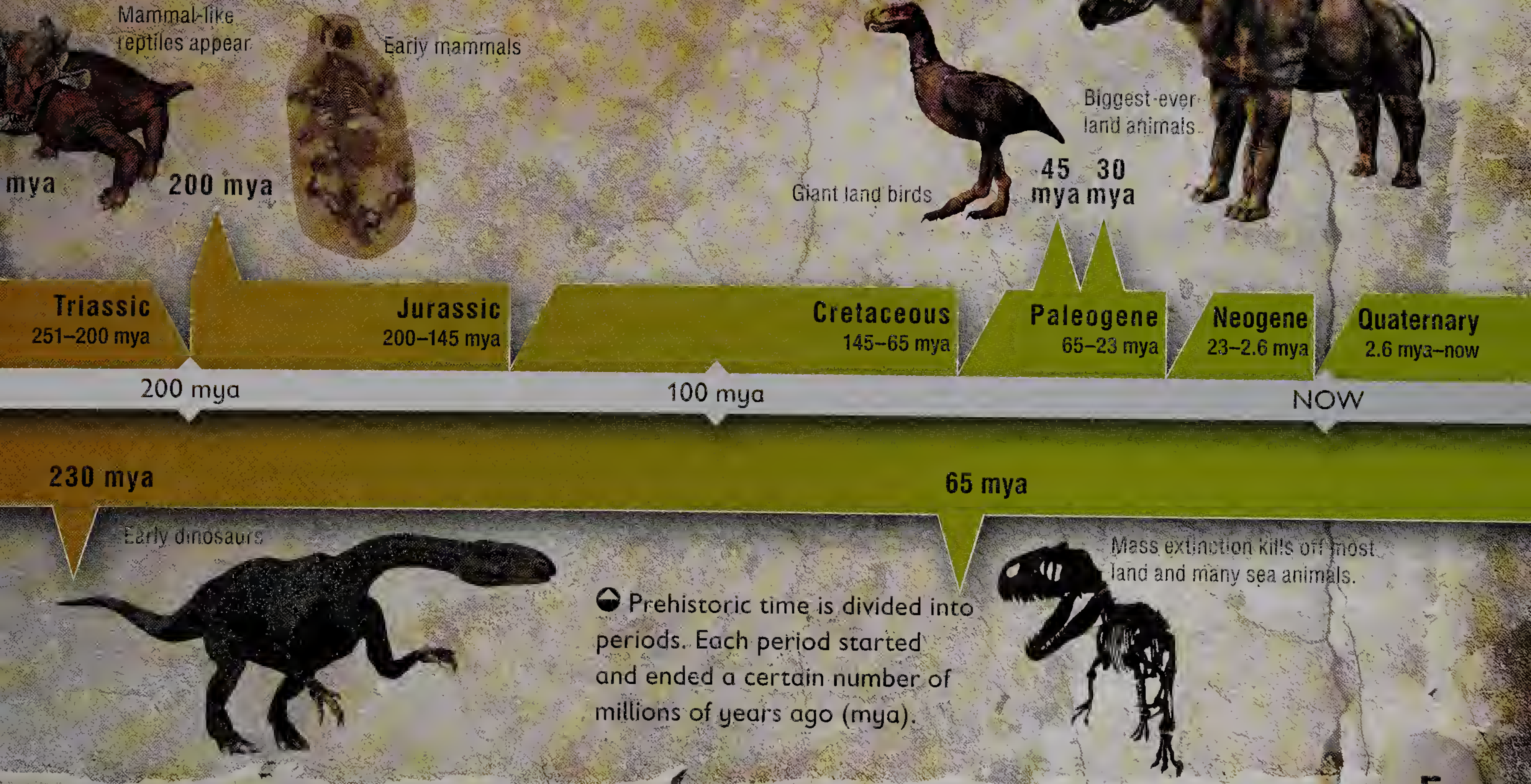
Gradually land plants grew into the first trees. Land creatures became larger too. The giant millipede *Arthropleura* was as big as your bed!



A creature now living, which looks like some of the early land animals, is the velvet worm. It lives in damp forests and is squishy and wriggly, but it also has lots of stumpy, bendy legs for walking.



*Arthropleura* had a hard body-covering and more than 40 legs. It probably ate bits of plants and small creatures, such as worms and bugs.



Prehistoric time is divided into periods. Each period started and ended a certain number of millions of years ago (mya).

# FINS TO LEGS

**From about 380 million years ago, new kinds of creatures appeared. They began to poke their heads out of the water and wriggle toward the shore.**

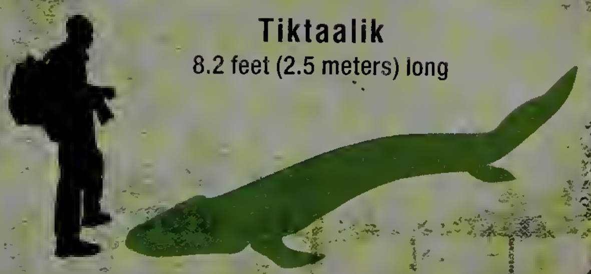
These animals were still fish. But they could breathe air using lungs, as well as breathe in water. They could also pull themselves along on land using their fins, which had strong muscles—almost like legs.

*Tiktaalik* was one of these strange four-legged fish. It probably lived in swamps, snapping up **prey** such as worms and smaller fish with its sharp teeth.

## WILD!

Most fish have a head that merges straight into the body, without a neck. But *Tiktaalik* could bend its head on its body, making it the first fish with a neck!

## HOW BIG?



◑ The fishy creature *Panderichthys* was 47 inches(120 centimeters) long. Its two front leg-like fins were bigger and stronger than the two back ones.

◒ The fins of *Tiktaalik* had small, slim bones inside that were similar to the finger and toe bones of later creatures.

## WILD FILE

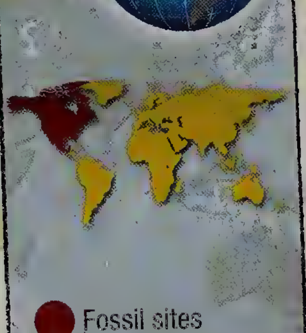
### Tiktaalik

**GROUP** Fish—**lobe-fins**

**WHEN** Devonian Period

**FOOD** Smaller water creatures

**FOSSIL SITES** North America, including Canada

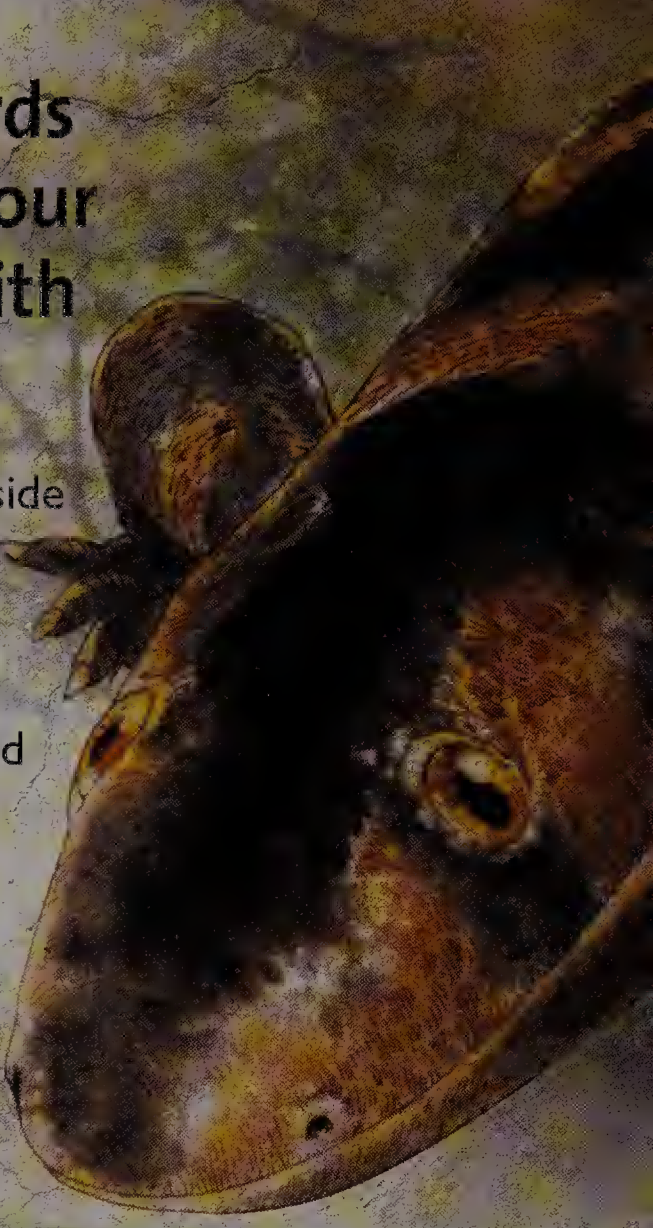


# FIRST ON FOUR LEGS

**Many land animals, from lizards to elephants, run around on four legs. But the first creatures with four legs didn't run at all.**

Animals called **tetrapods** have a backbone inside the body and four legs. (Some have two arms and two legs, like … you!) The legs and toes of tetrapods were first used in water, perhaps for crawling through thick weeds. Only later did they become useful for moving on land.

Early tetrapods were *Ichthyostega* and *Acanthostega*. They could breathe air and waddle about on dry ground. The land was getting busier!



## WILD FILE

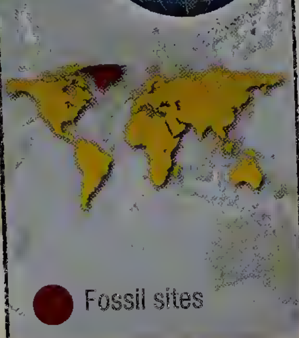
### Ichthyostega

**GROUP** Tetrapods

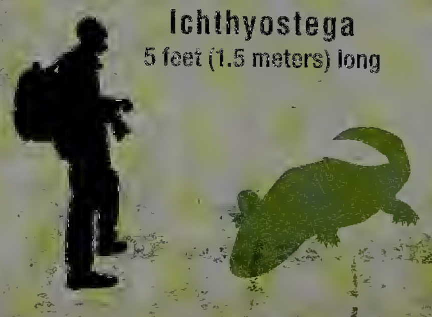
**WHEN** Late Devonian Period

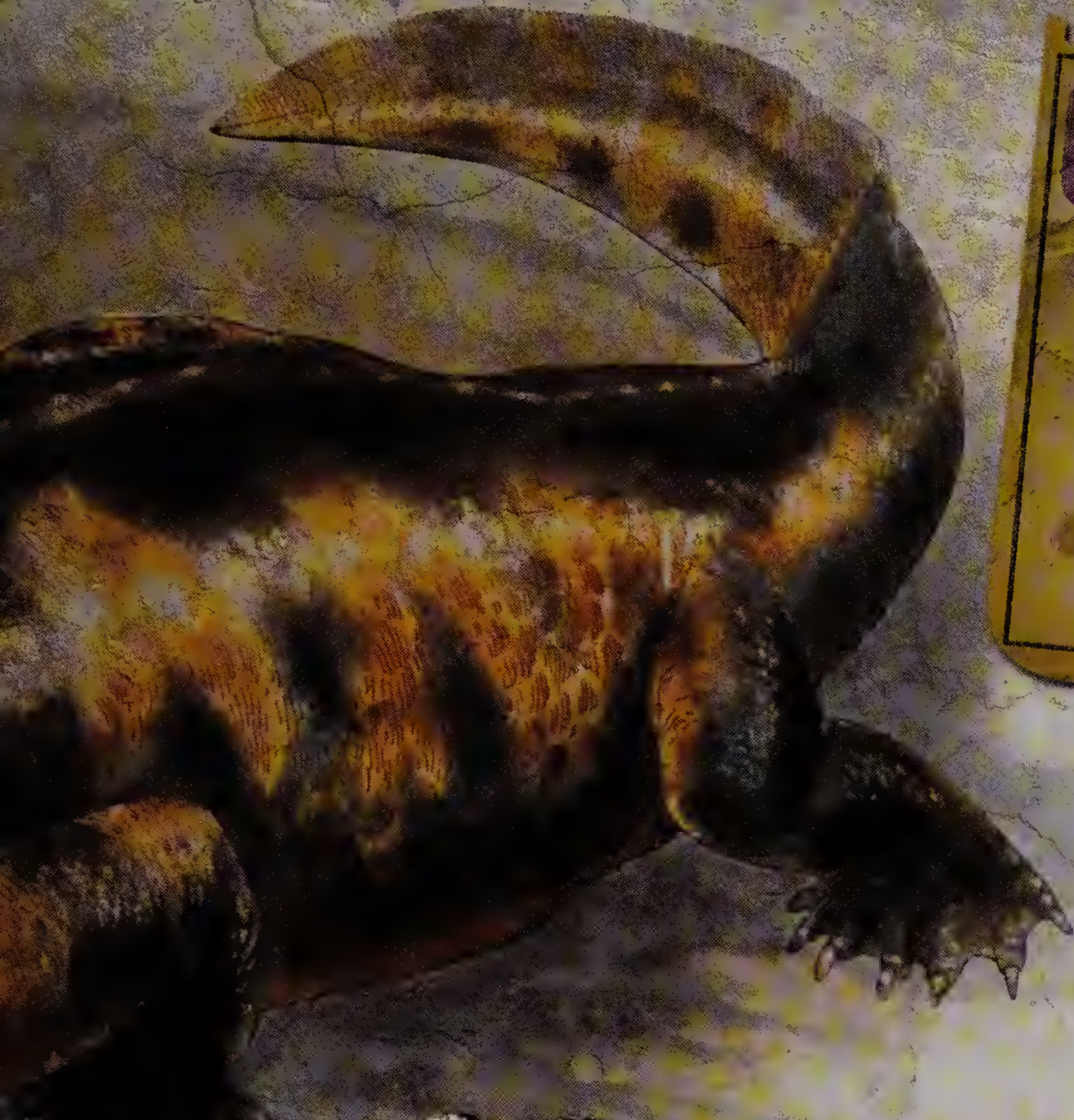
**FOOD** Small animals

**FOSSIL SITES** Greenland



## HOW BIG?

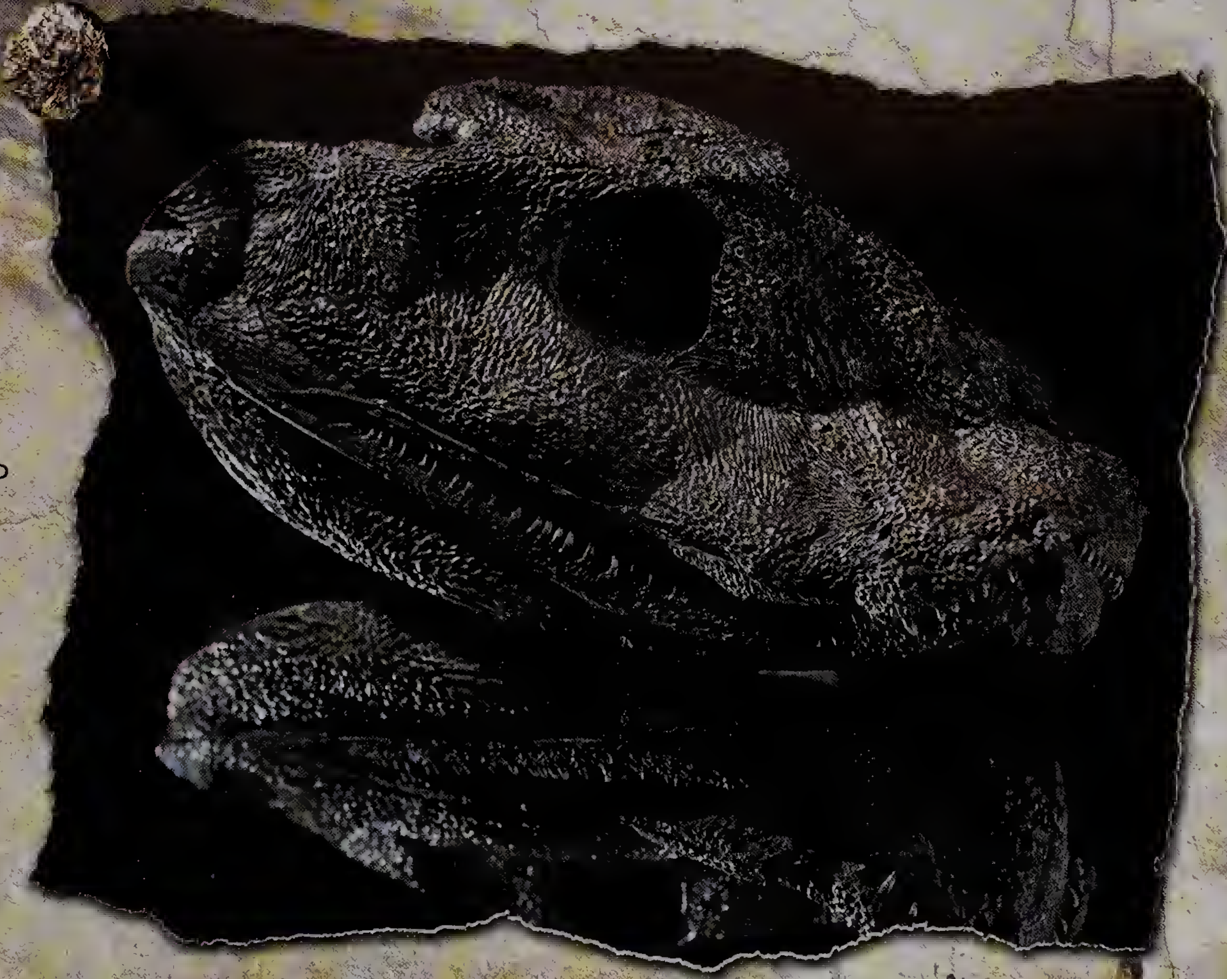




**WILD!**

*Ichthyostega* had seven toes on each back foot, not five like later land animals. There are no fossils of its front feet, so we have to guess about the toes.

◑ *Ichthyostega* was halfway between a water creature and a land animal. It probably sunbathed to warm up, then dived into the water to hunt prey, like a giant slimy newt.



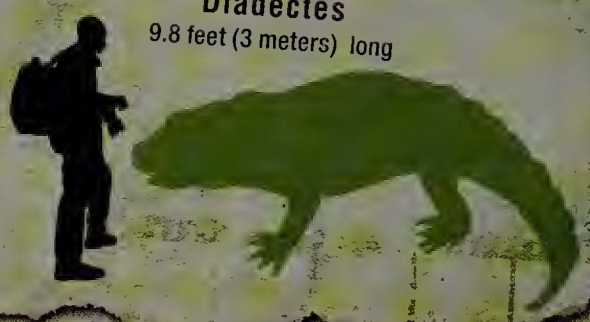
◐ This fossil skull (head bone) of *Acanthostega* shows its many small, sharp teeth. They were used to catch animal food such as fish and water bugs.

# LAND INVASION

**As four-legged animals spread over the land, they changed or evolved into many different kinds. One of the biggest and toughest was *Diadectes*.**

We know how animals changed in the past from their fossils. These are remains of once-living things preserved in the rocks and turned to stone. Fossils show that *Diadectes* was large and heavy, with strong legs for running.

**HOW BIG?**

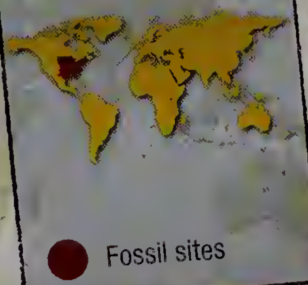


**Diadectes**
9.8 feet (3 meters) long

**WILD FILE**

**Diadectes**

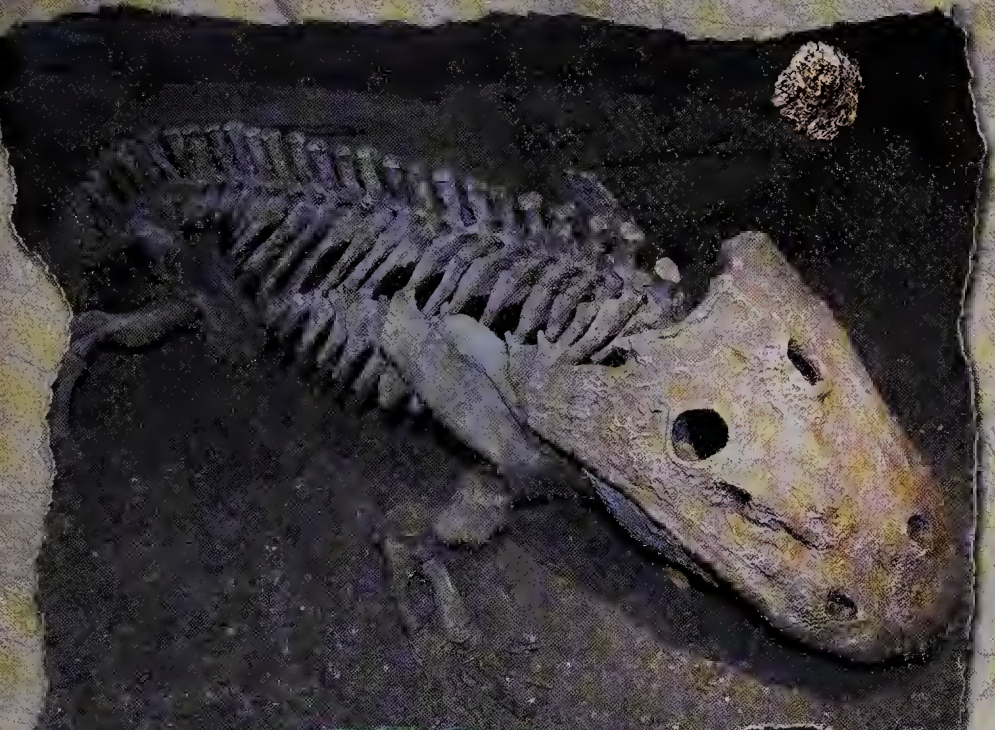
**GROUP** Tetrapods
**WHEN** Early Permian Period
**FOOD** Plants
**FOSSIL SITES** Eastern North America



● Fossil sites

*Diadectes* had lots of teeth, but these were not sharp. The front teeth were like a rake for gathering leaves, which the wide back teeth chewed before swallowing.

◐ *Diadectes* was one of the first really big plant-eaters on land. It was also one of the first to hold its body off the ground on its strong legs.



*Eryops* the tetrapod was 6.5 feet (2 meters) long. It had a very thick skull bone and strong legs for running. It could open its big mouth wide to grab many kinds of prey.

## CLOSE COUSINS

*Diadectes* was a cousin of the living animals called **amphibians**. It was about three times heavier than today's largest amphibian, the Chinese giant salamander.

# SUNNY SAILS

**As more animals crowded onto the land, staying alive became difficult—especially when fearsome *Dimetrodon* was around!**

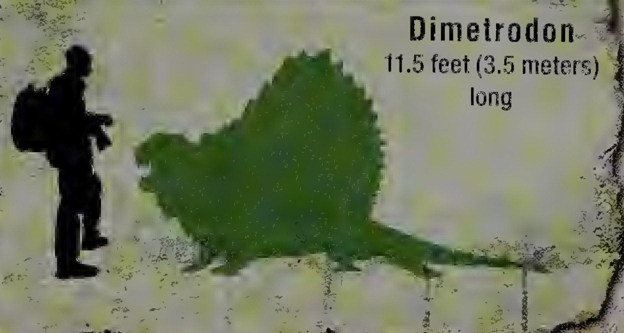
*Dimetrodon* was one of the biggest animals of its time. Its long, sharp teeth are the sign of a fierce hunter. On its back was a tall flap of skin, like a ship's sail, held up by thin rods of bone.

*Dimetrodon* was probably **cold-blooded**, like all animals of its time. In the early morning its sail would soak up the sun's heat. So *Dimetrodon* would warm up quickly and be able to chase after colder, slower prey.

## WILD!

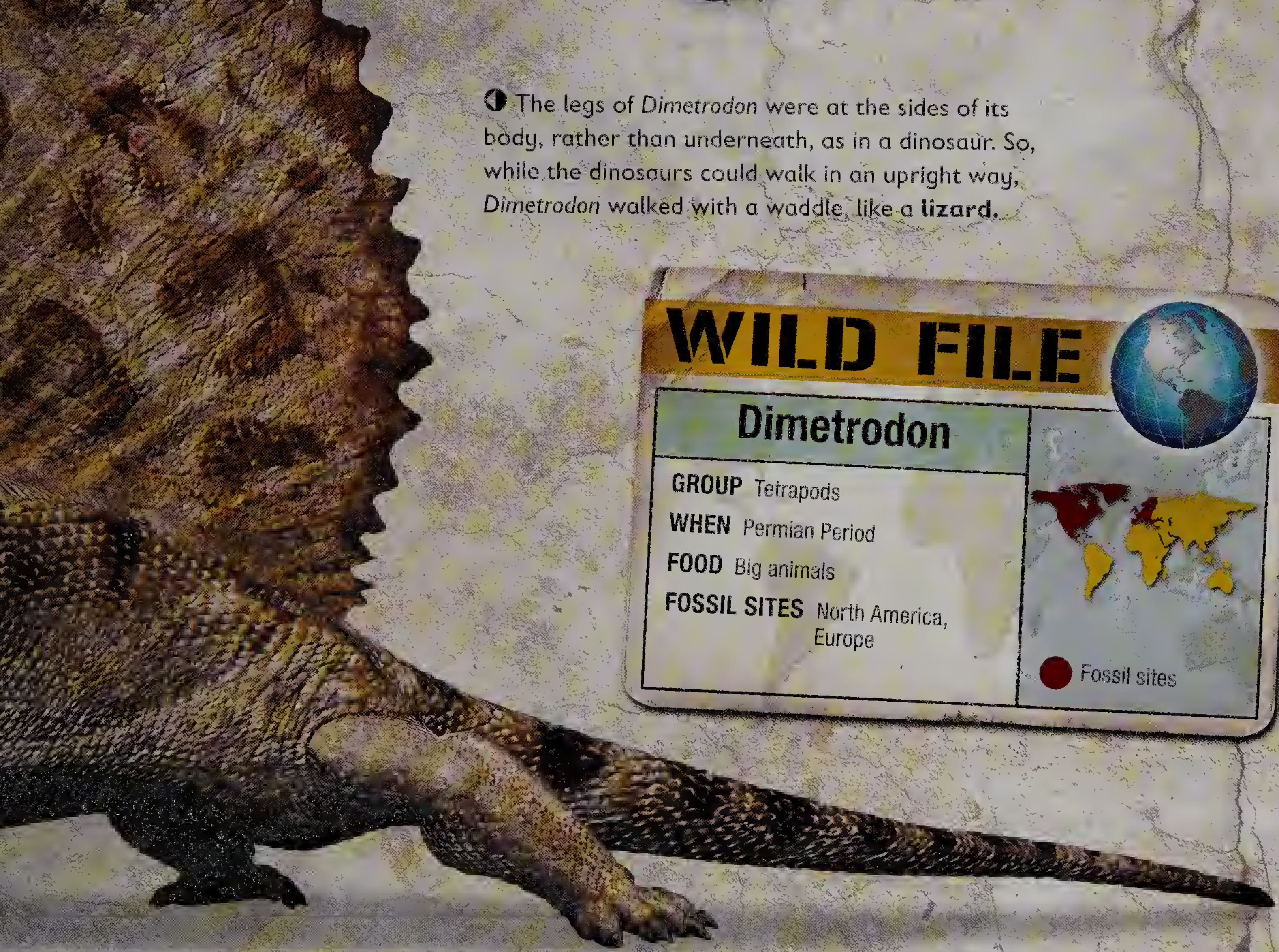
In 1907 *Dimetrodon* fossils were put on display in New York. But they were mixed up with another large **sail-back**, the plant-eater *Edaphosaurus*—one of *Dimetrodon's* main victims!

## HOW BIG?



◐ The plant-eater *Scutosaurus* was as big as a horse but much heavier. It was protected from attack by hard scale-like plates called **scutes** in its skin.

◐ The legs of *Dimetrodon* were at the sides of its body, rather than underneath, as in a dinosaur. So, while the dinosaurs could walk in an upright way, *Dimetrodon* walked with a waddle, like a **lizard.**



## WILD FILE

### Dimetrodon

**GROUP** Tetrapods

**WHEN** Permian Period

**FOOD** Big animals

**FOSSIL SITES** North America, Europe

● Fossil sites

# OPEN WIDE!

## In 2001, fossils of the biggest-ever crocodile were found in the Sahara. What was it doing in the world's largest desert?

About 110 million years ago, in the **Age of the Dinosaurs**, the **Sahara** was very different. It was a region of tropical forests and woods with lots of rivers, lakes, and streams. Here lived *Sarcosuchus*—a giant crocodile as long as a bus, with a mouth the size of a doorway.

*Sarcosuchus* probably hunted in the water for fishes. It might also have come onto land to attack and eat baby dinosaurs.

### WILD!

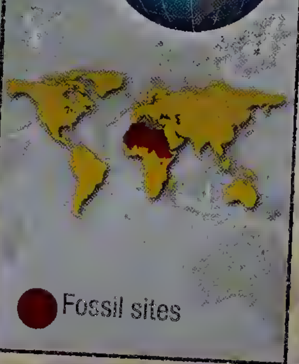
The biggest crocodile today is the saltwater croc. *Sarcosuchus* was twice as long and five times heavier. If *Sarcosuchus* was alive today, it could eat a 'saltie' for breakfast!

▼ *Sarcosuchus* might wait in the water for young dinosaurs and other animals to come and drink. Then, it would leap out and attack them.

### WILD FILE

#### Sarcosuchus

| | |
|---|---|
| **GROUP** | **Reptiles**—crocodiles |
| **WHEN** | Cretaceous Period |
| **FOOD** | Medium-sized animals |
| **FOSSIL SITES** | North Africa |

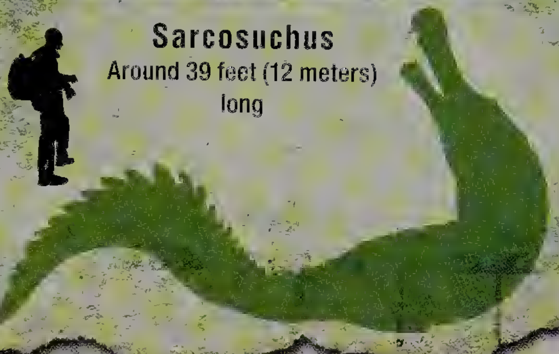


● Fossil sites

*Desmatosuchus* looked like a flesh-eating crocodile. But it was a different kind of creature called an **aetosaur**, and it fed on plants.

## HOW BIG?

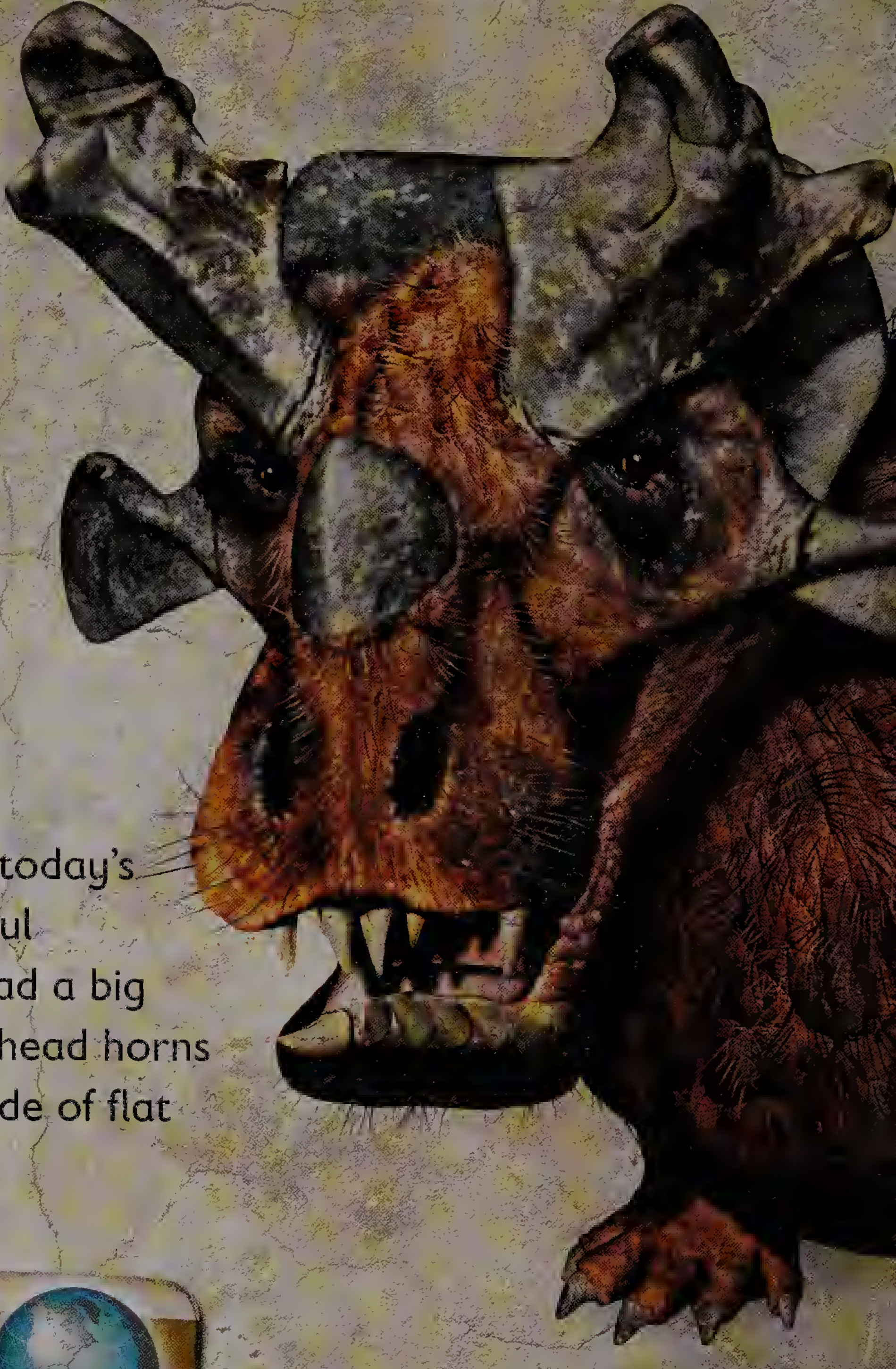
**Sarcosuchus**
Around 39 feet (12 meters) long



# HUGE HORNS

**As land creatures became more varied, some developed strange features. One of the weirdest-looking of them all was *Estemmenosuchus*.**

*Estemmenosuchus* was the size of today's rhinoceros, with massive, powerful muscles in its legs and chest. It had a big mouth and sharp teeth. Its huge head horns were not long and sharp, but made of flat parts sticking out at odd angles.



## WILD FILE

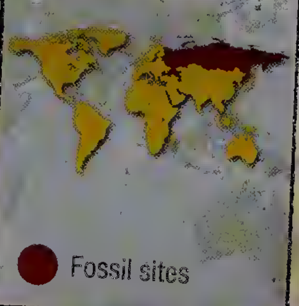
### Estemmenosuchus

**GROUP** Tetrapods – therapsids, or mammal-like reptiles

**WHEN** Permian Period

**FOOD** Not known. Plants, animals or perhaps both.

**FOSSIL SITES** Russia

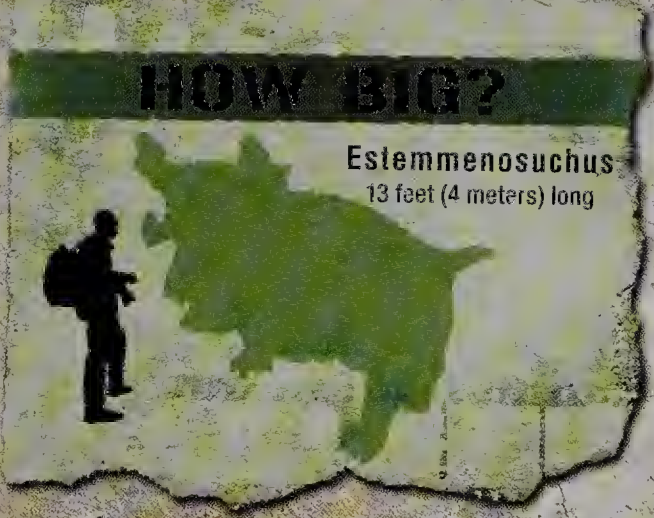


Fossils of the skin of *Estemmenosuchus* have no reptile-like scales, so it may have had hair, like a **mammal**. It belonged to an in-between group of animals called **mammal-like reptiles**.

◐ Almost 10 feet (3 meters) long, *Titanophoneus* was a slim, speedy meat-eater. Like *Estemmenosuchus* it belonged to the mammal-like reptile group of animals.

## WILD!

A **herd** of *Estemmenosuchus* may have used their horns to fight each other at breeding time. Imagine the noise as their enormous heads banged and crashed together!



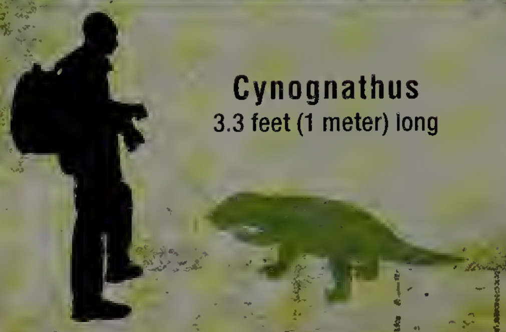
# THE FIRST FURRY KILLERS

**As well as mammal-like reptiles, there were also furry, warm-blooded creatures called mammals.**

The first mammals probably developed from small mammal-like reptiles more than 200 million years ago. In the beginning, they were rat-sized, and they ate small creatures such as worms and bugs.

Gradually some mammals grew bigger, although none was larger than a big pet dog of today. Some of them could have eaten dinosaur eggs or even baby dinosaurs.

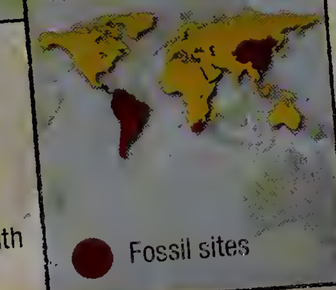
## HOW BIG?

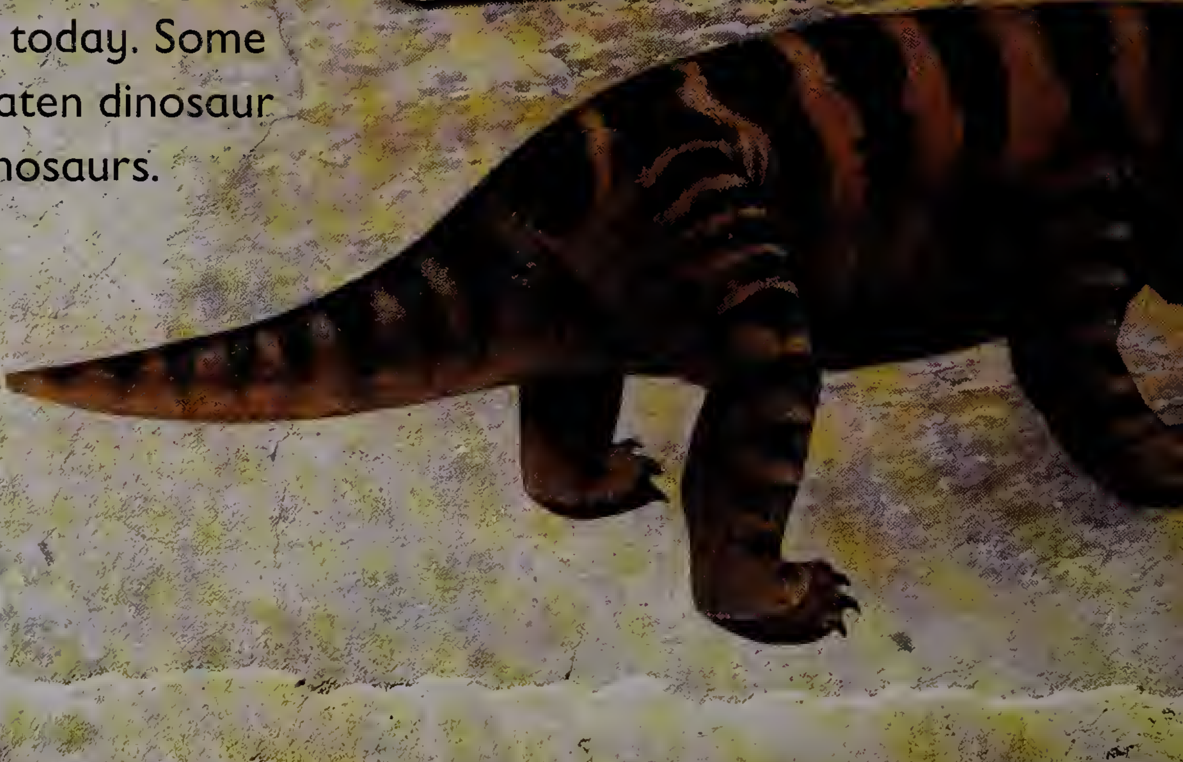


## WILD FILE

### Cynognathus

| | |
|---|---|
| **GROUP** | Therapsids, or mammal-like reptiles |
| **WHEN** | Early–Mid Triassic Period |
| **FOOD** | Animal prey |
| **FOSSIL SITES** | South America, South Africa, East Asia |

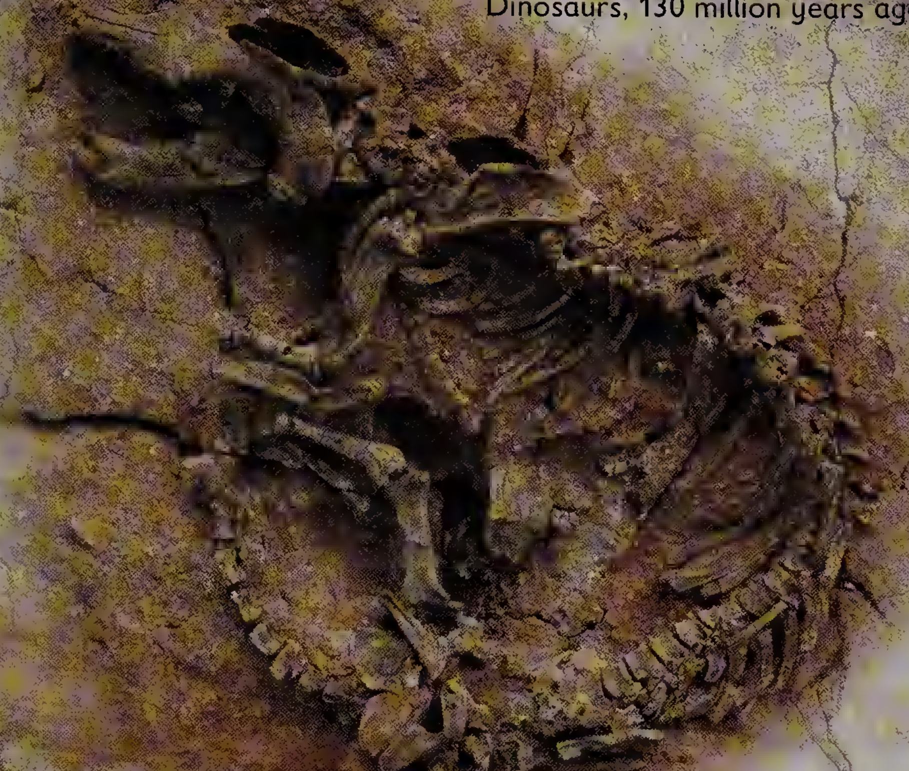




## WILD!

One fossilized *Repenomamus* was preserved with the remains of a baby dinosaur, *Psittacosaurus*, inside its body. Was the little dinosaur the last meal of *Repenomamus*?

Fossils of *Repenomamus* discovered in China show that it was one of the largest mammals of its time – similar in size and shape to today's badger. It lived in the middle of the Age of the Dinosaurs, 130 million years ago.



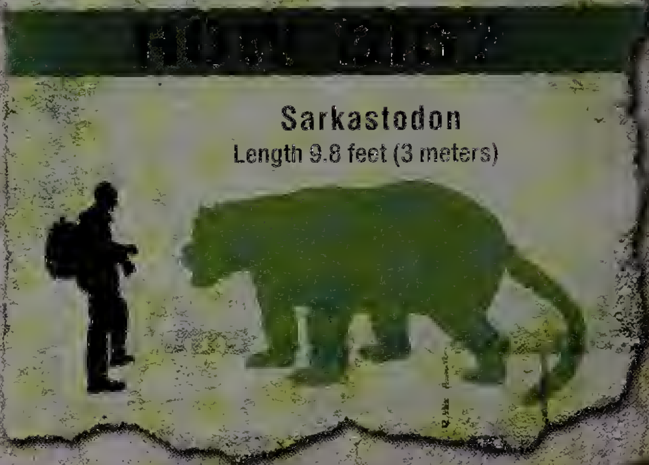
*Cynognathus* had strong jaws and sharp teeth, like a wolf. It probably hunted small prey and chewed the already-dead bodies of big animals.

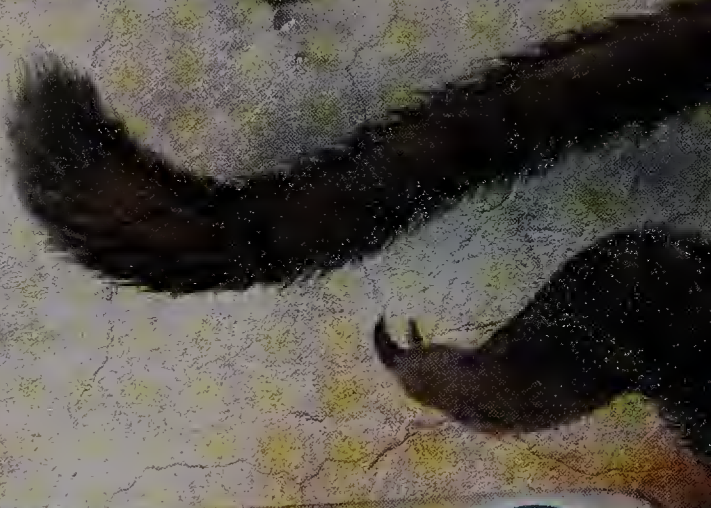
# DEADLY HUNTERS

**The Age of the Dinosaurs ended 65 million years ago. The land was quiet for a time. Soon new kinds of animals appeared, such as the frightening bear-like *Sarkastodon*.**

*Sarkastodon* looked like a combination of bear and dog. It had massively wide, strong teeth to chew meat and crush bones. It belonged to a group of predators called creodonts.

Other **creodonts** included the wolf-like *Hyaenodon*, and *Oxyaena*, which was similar to a large cat. Despite their size and power, all creodonts died out by about eight million years ago.





## WILD FILE

### Sarkastodon

**GROUP** Mammals – creodonts
**WHEN** Paleogene Period
**FOOD** Animals
**FOSSIL SITES** Central Asia

◐ Unlike a bear, *Sarkastodon* had a long tail. But like a bear, it walked on the flat parts or soles, of its feet. Probably it was a slow mover, not a fast runner.

*Hyaenodon* had a long, thin snout with sharp teeth. Maybe it howled at night, like today's wolves and coyotes!

## WILD!

*Sarkastodon* had plenty of big animals to hunt. Living at the same time and in the same region were rhinos and creatures called chalicotheres, which were cousins of today's horses.

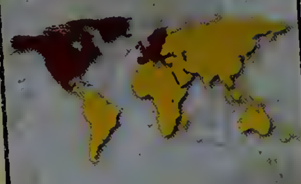
# TERROR BIRDS

**After the dinosaurs, most of the big strong animals on land were mammals. Yet there were also great birds who could put up a good fight.**

### WILD FILE

**Gastornis**

| | |
|---|---|
| **GROUP** | Birds—flightless |
| **WHEN** | Paleogene Period |
| **FOOD** | Animal prey |
| **FOSSIL SITES** | North America, Europe |

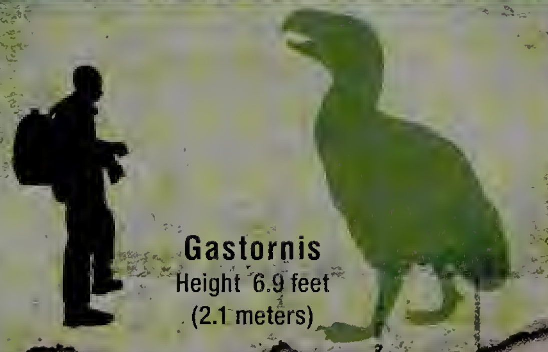


● Fossil sites

*Gastornis* was as tall as an ostrich, but much stronger and heavier. Its sharp beak had a hooked tip, like an eagle. Its legs were very powerful with pointed claws on the toes.

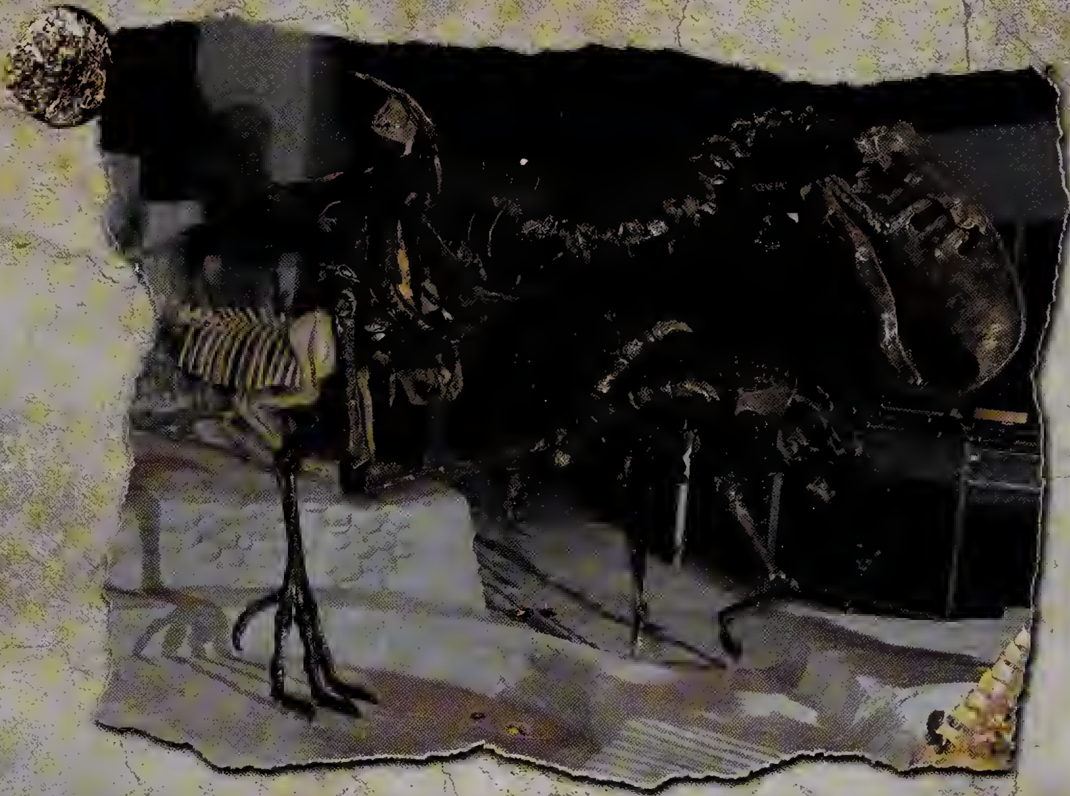
*Gastornis* was probably a fast-running **predator**. It chased after smaller animals, kicked and scratched them with its claws, then pecked them to death and tore them apart with its huge beak.

### HOW BIG?



◐ The wings of *Gastornis* were much too small and weak for flight. This **flightless bird** may have had soft, hair-like feathers rather than the broad, stiff feathers of flying birds.

*Titanis* was a fierce hunting bird that could not fly—like *Gastornis* but even bigger! Its fossils were found in North America and are about three million years old.



## CLOSE COUSINS

*Gastornis* might have looked like a very strong, hook-beaked ostrich or an eagle with tiny wings. But its nearest relatives today are barnyard ducks and geese.

# SABER TEETH!

**For animals that kill to eat, the best weapons are teeth. *Thylacosmilus* certainly had big teeth!**

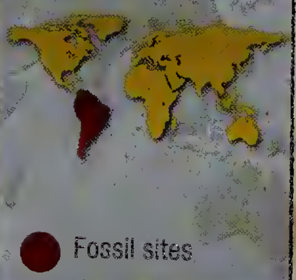
*Thylacosmilus* looked like a big cat, with sharp claws, but it was in a different animal group, the **marsupials**. Its long upper teeth were curved like the type of sword called a saber. With its mouth closed, these upper teeth fitted into flaps in the lower jaw for protection.

*Thylacosmilus* may have stabbed its victims to death with its saber teeth. Or it could have slashed at them to cause terrible flesh wounds, so they bled to death.

## WILD FILE

### Thylacosmilus

**GROUP** Mammals—marsupial-like
**WHEN** Neogene Period
**FOOD** Animal prey
**FOSSIL SITES** South America



● Fossil sites

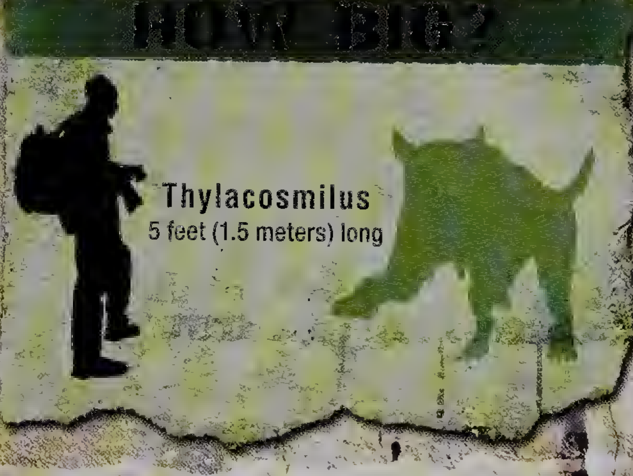
*Andrewsarchus* was a giant mammal predator more than 13 feet long (4 meters) and taller than a person. It lived about 40 million years ago.

*Thylacosmilus* would have leaped at its prey. With its huge claws ready to rip its victim's flesh, and its massive saber teeth bared, it would have been a terrifying sight.

## CLOSE COUSINS

*Thylacosmilus* was related to marsupials, or pouched mammals, whose babies grow in the mother's pocket of skin. Its near cousins today are possums, wombats, koalas, and kangaroos!

## HOW BIG?

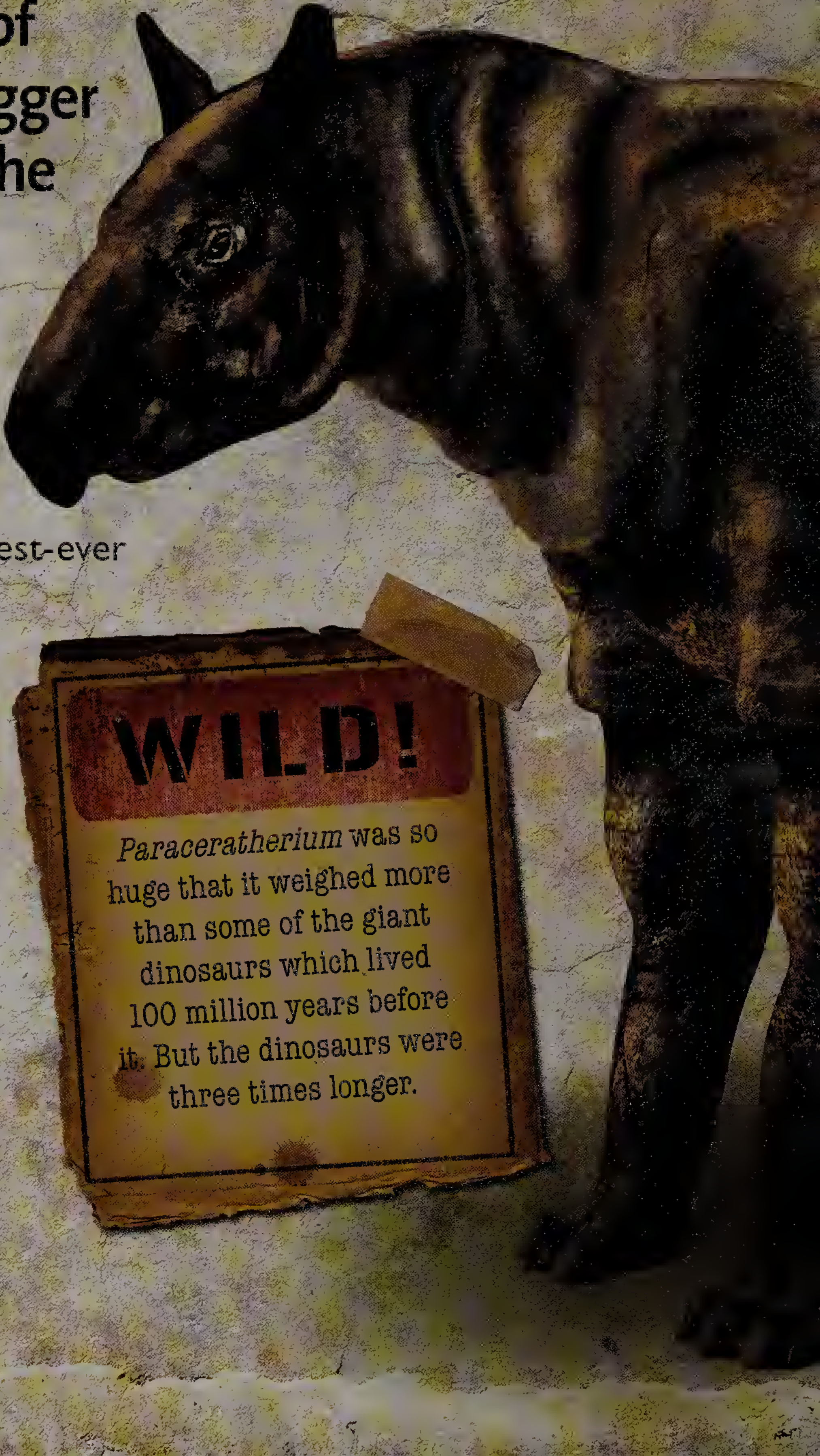


# BIGGEST EVER

**Today's biggest land animal is the elephant. Millions of years ago, much bigger creatures roamed the world—including a giant hornless rhinoceros.**

*Paraceratherium* was the largest-ever land animal, weighing up to 22 tons—four times heavier than an elephant. Like many other rhinos that lived long ago, it had no horn on its nose.

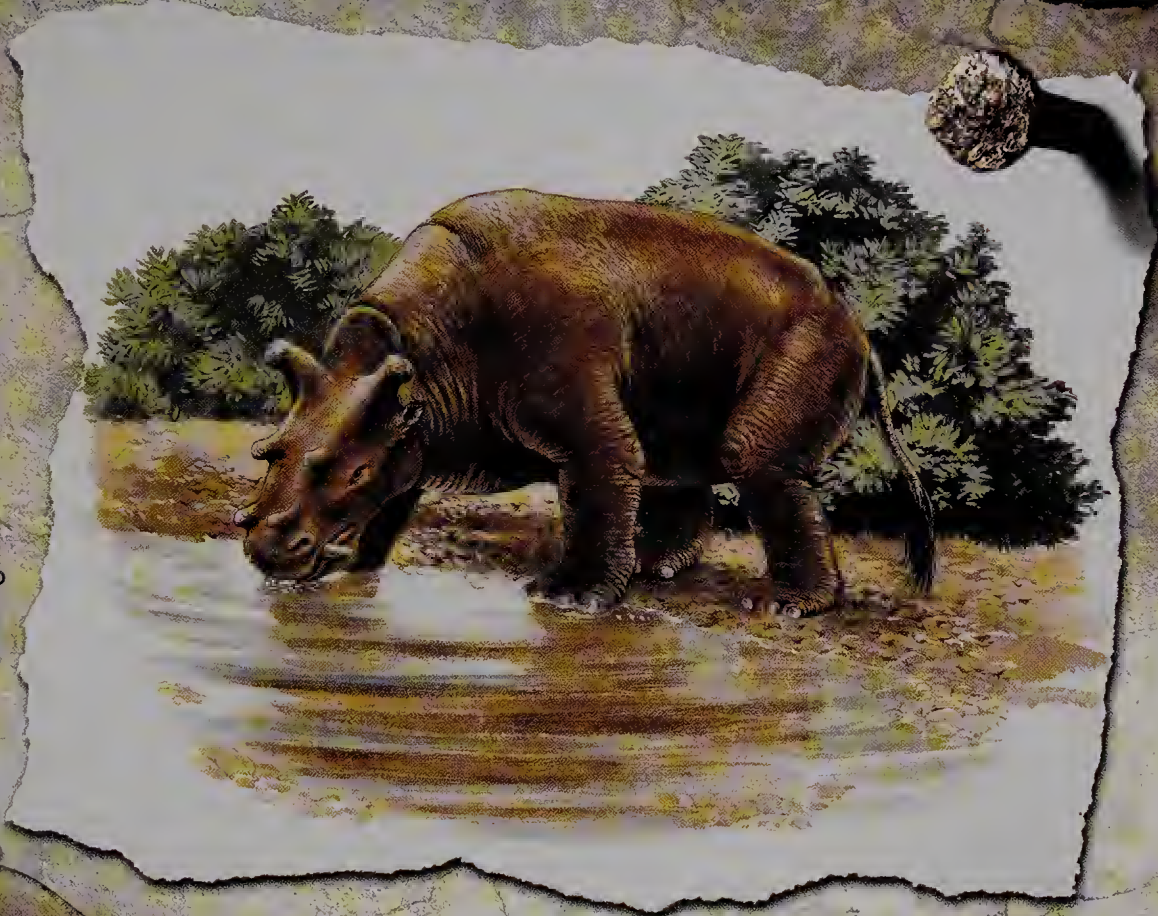
*Paraceratherium's* head was 25 feet (7.5 meters) above the ground—6.5 feet (2 meters) higher than a giraffe's. This vast beast was a gentle giant, munching leaves, twigs, and fruit from the treetops.



**WILD!**

*Paraceratherium* was so huge that it weighed more than some of the giant dinosaurs which lived 100 million years before it. But the dinosaurs were three times longer.

◐ Another plant-eater, *Uintatherium* was about as big as the rhinoceros of today. It had a knobbly head and two tusks for fighting enemies. *Uintatherium* lived around 40 million years ago.



◓ *Paraceratherium* had a very long, bendy upper lip and probably a long tongue too. So it could reach even higher into the branches to pull off leaves.

## WILD FILE

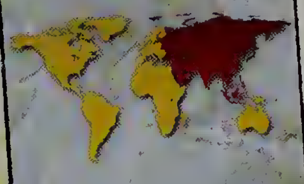
### Paraceratherium

**GROUP** Mammals – rhinos

**WHEN** Late Paleogene and Neogene Periods

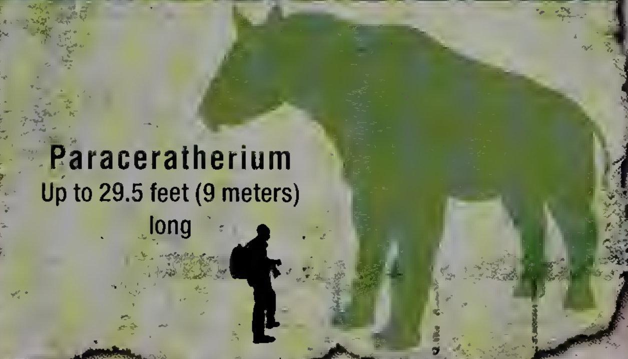
**FOOD** Tree leaves and other plants

**FOSSIL SITES** East Europe, Asia



● Fossil sites

## HOW BIG?



**Paraceratherium**
Up to 29.5 feet (9 meters) long

# WILD GUIDE

## LATE DEVONIAN TO MID PERMIAN PERIODS

380 to 275 million years ago

### Panderichthys

**Pronunciation** pan-dur-ich-this

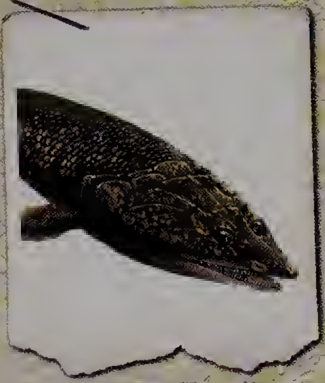
**Meaning** Pander's fish

**Group** Fish—lobe-fins

**Time** Late Devonian, 380 mya

**Length** 3.9 ft (1.2 m)

**Weight** 33 lbs (15 kg)



### Tiktaalik

**Pronunciation** tick-taa-lick

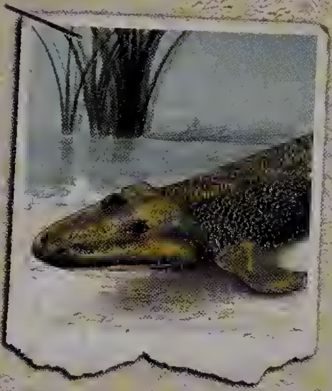
**Meaning** Burbot fish

**Group** Fish—lobe-fins

**Time** Late Devonian, 375 mya

**Length** 8.2 ft (2.5 m)

**Weight** 165 lbs (75 kg)



### Ichthyostega

**Pronunciation** ick-thee-oh-stay-ga

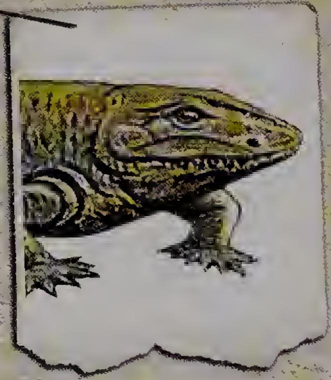
**Meaning** Fish root

**Group** Tetrapods

**Time** Late Devonian, 365 mya

**Length** 5 ft (1.5 m)

**Weight** 55 lbs (25 kg)



### Acanthostega

**Pronunciation** ack-an-tho-stay-ga

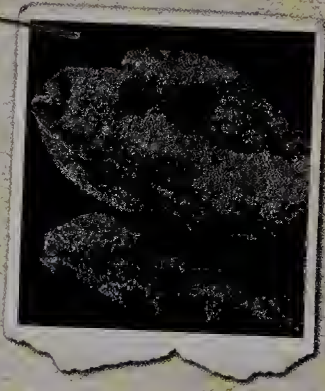
**Meaning** Spiky roof

**Group** Tetrapods

**Time** Late Devonian, 365 mya

**Length** 23.6 in (60 cm)

**Weight** 11 lbs (5 kg)



### Arthropleura

**Pronunciation** arth-roe-plur-a

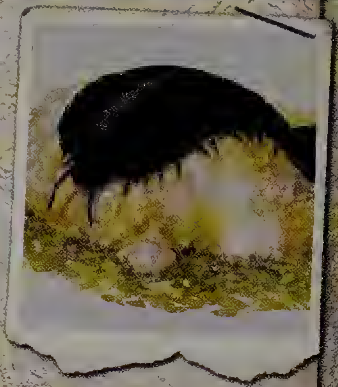
**Meaning** Rib joint

**Group** Arthropods

**Time** Mid Carboniferous, 340–300 mya

**Length** 8.2 ft (2.5 m)

**Weight** 220 lbs (100 kg)



### Eryops

**Pronunciation** air-ee-ops

**Meaning** Long face

**Group** Tetrapods – amphibian-like

**Time** Early Permian, 295 mya

**Length** 6.5 ft (2 m)

**Weight** 176 lbs (80 kg)

### Diadectes

**Pronunciation** die-ah-deck-teez

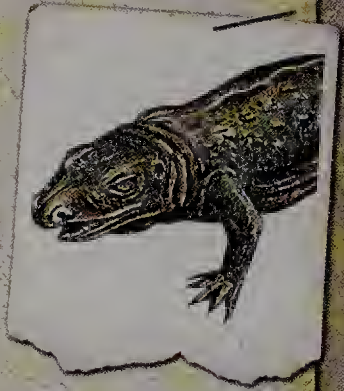
**Meaning** Royal swimmer

**Group** Tetrapods – amphibian-like

**Time** Early Permian, 280 mya

**Length** 9.8 ft (3 m)

**Weight** 330 lbs (150 kg)



### Dimetrodon

**Pronunciation** die-meet-row-don

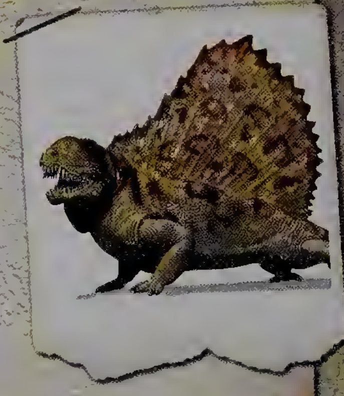
**Meaning** Two measures of teeth

**Group** Tetrapods – pelycosaurs

**Time** Mid Permian, 275 mya

**Length** 11.5 ft (3.5 m)

**Weight** 330 lbs (150 kg)



# WILD GUIDE

## LATE PERMIAN TO MID CRETACEOUS PERIODS

260 to 110 million years ago

### Estemmenosuchus

**Pronunciation** es-tem-en-oh-sook-us

**Meaning** Crowned crocodile

**Group** Mammal-like reptiles

**Time** Late Permian, 260 mya

**Length** 13 ft (4 m)

**Weight** 1764 lbs (800 kg)

### Titanophoneus

**Pronunciation** tie-tan-oh-foe-nee-us

**Meaning** Giant killer

**Group** Mammal-like reptiles

**Time** Late Permian, 255 mya

**Length** 13 ft (4 m)

**Weight** 440 lbs (200 kg)

### Scutosaurus

**Pronunciation** scoot-oh-saw-rus

**Meaning** Shield reptile

**Group** Reptiles—anapsids

**Time** Late Permian, 252 mya

**Length** 8.2 ft (2.5 m)

**Weight** 1100 lbs (500 kg)

### Cynognathus

**Pronunciation** sigh-nog-nay-thus

**Meaning** Dog jaw

**Group** Mammal-like reptiles

**Time** Early Triassic, 240 mya

**Length** 3.3 ft (1 m)

**Weight** 66 lbs (30 kg)

### Thrinaxodon

**Pronunciation** thrin-axe-owe-don

**Meaning** Three-pronged tooth

**Group** Mammal-like reptiles

**Time** Early Triassic, 245 mya

**Length** 15.8-20 in (40-50 cm)

**Weight** 6.6 lbs (3 kg)

### Desmatosuchus

**Pronunciation** dez-mat-oh-sook-us

**Meaning** Link crocodile

**Group** Reptiles—aetosaurs

**Time** Late Triassic, 210 mya

**Length** 16.4 ft (5 m)

**Weight** 882 lbs (400 kg)

### Repenomamus

**Pronunciation** rep-ee-no-marm-us

**Meaning** Reptile mammal

**Group** Mammals—triconodonts

**Time** Early Cretaceous, 130 mya

**Length** 3.6 ft (1.1 m)

**Weight** 33 lbs (15 kg)

### Sarcosuchus

**Pronunciation** sark-oh-sook-us

**Meaning** Flesh crocodile

**Group** Reptiles— crocodiles

**Time** Mid Cretaceous, 110 mya

**Length** 39 ft (12 m)

**Weight** 8.8 tons

# WILD GUIDE

## EARLY PALAEOGENE TO QUATERNARY PERIODS

50 to 2 million years ago

### Gastornis

**Pronunciation** gass-torn-iss

**Meaning** Gaston's bird

**Group** Birds—flightless

**Time** Paleogene, 50 mya

**Height** 6.9 ft (2.1 m)

**Weight** 331 pounds

### Hyaenodon

**Pronunciation** high-een-oh-don

**Meaning** Hyaena tooth

**Group** Mammals—creodonts

**Time** Paleogene–Neogene, 40–20 mya

**Length** 9.8 ft (9 m)

**Weight** 440 lbs (200 kg)

### Uintatherium

**Pronunciation** win-ta-theer-ee-um

**Meaning** Uinta beast

**Group** Mammals—dinoceratans

**Time** Paleogene, 40 mya

**Length** 14.8 ft (4.5 m)

**Weight** 2.2 tons

### Andrewsarchus

**Pronunciation** an-drew-sark-us

**Meaning** Andrew's ruler

**Group** Mammals—mesonychid

**Time** Paleogene, 40 mya

**Length** 14.8 ft (4.5 m)

**Weight** 1543 lbs (700 kg)

### Sarkastodon

**Pronunciation** sar-kass-toe-don

**Meaning** Protector tooth

**Group** Mammals—creodonts

**Time** Paleogene, 36 mya

**Length** 9.8 ft (3 m)

**Weight** 1.1 tons

### Paraceratherium

**Pronunciation** para-seer-ah-theer-ee-um

**Meaning** Next to horn beast

**Group** Mammals—rhinos

**Time** Late Paleogene, Early Neogene, from 33 mya

**Length** 29.5 ft (9 m)

**Weight** 22 tons

### Thylacosmilus

**Pronunciation** thigh-la-cos-mile-us

**Meaning** Pouch sword

**Group** Mammals—marsupial-like

**Time** Neogene, 20 mya

**Length** 5 ft 1.5 m)

**Weight** 220 lbs (100 kg)

### Titanis

**Pronunciation** tie-tan-iss

**Meaning** Giant, titan

**Group** Birds—flightless

**Time** Late Neogene and Early Quaternary, 5–2 mya

**Height** 8.3 feet

**Weight** 375 lbs (170 kg)

# GLOSSARY

**Aetosaur** A type of reptile that looked like a crocodile but ate plants, with strong protective scales and horns.

**Age of the Dinosaurs** The time when dinosaurs were the main large land animals, from about 230 to 65 million years ago.

**Amphibian** An animal that lays its eggs in water, but lives most of its life on land.

**Bugs** Many kinds of small scuttling creatures like insects, spiders, millipedes, and centipedes.

**Cold-blooded** A creature that cannot make body warmth inside itself, and so has a body temperature the same as its surroundings.

**Creodonts** Meat-eating animals similar to the cats, dogs, and hyenas of today, but which have all died out.

**Evolve** When living things change gradually over a long period of time.

**Flightless birds** Members of the bird group, with a beak, feathers, and wings, but whose wings are too small to let them take off and fly.

**Herd** A group of animals that stays together for most of the time, usually plant-eaters such as horses, elephants, or deer.

**Insect** A small animal with a hard body casing and six legs, and usually two or four pairs of wings.

**Lizard** A reptile with four limbs, a long tail, a round ear patch at the head's side, and overlapping scales.

**Lobe-fin fish** A fish with fins that have strong muscles in fleshy lumps or lobes at the base.

**Mammal** An animal that has hair or fur and produces milk for its babies.

**Mammal-like reptiles** Animals that were partly like reptiles, and also partly like mammals, with fur or hair and warm blood. They have all died out.

**Marsupials** Mammals that carry their newborn babies in a pouch in their bodies. *Thylacosmilus* was an early marsupial.

**Mites** Very small creatures with eight legs—they are close cousins of spiders.

**Predator** An animal that hunts and kills other creatures for food.

**Prey** A creature that is killed and eaten by another animal, the predator.

**Reptile** A scaly, usually cold-blooded animal, such as a lizard, snake, crocodile, turtle, or dinosaur.

**Sahara** The world's biggest desert, taking up most of the northern part of Africa. Once it was a wet area and home to giant crocodile *Sarcosuchus*.

**Sail-back** A creature with a tall flap or extension of skin on its back.

**Scutes** Hard parts, like big scales, in an animal's skin that help to protect it.

**Tetrapods** Animals with four legs, or four limbs—two arms and two legs.

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